

Algorithm Design
M. T. Goodrich and R. Tamassia
John Wiley & Sons
Solution of Exercise C-11.6

By sorting the edges incident on each vertex, we can implement Baruvka's algorithm much more efficiently. The critical computation involves determining, for a node, which is its lowest-cost edge leading to another component. By considering the incident edges by increasing weight, we will be discarding edges that go to other nodes in the present contour (and these edges can be ignored henceforth) until we find the minimum we need. Thus, each edge will be considered at most once; hence, the total message complexity will be $O(m + n \log n)$.